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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/499,525	02/10/2000	Hong Heather Yu	9432-000086	1397

7590 07/12/2005

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EXAMINER	
JACKSON, JAKIEDA R	

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/499,525	YU ET AL.	
	Examiner	Art Unit	
	Jakieda R Jackson	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,8-12 and 15-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8-12 and 15-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the Office Action mailed January 4, 2005, applicant submitted an amendment filed on April 4, 2005, in which the applicant traversed and requested reconsideration with respect to **claims 1, 11 and 17**.

Response to Arguments

2. Applicant argues that neither Tewfik et al. nor Sharma et al. together or combined, teach, suggest or motivate embedding data in the transform domain by manipulating the statistical mean of selected transform coefficients, and applying a scrambling technique to the transform coefficients with a scrambling filter kept as a secret key by a content owner. Tewfik teaches that with the proper keys, the embedded data may be extracted. Without the proper key(s), the data hidden in the signal is statistically undetectable and impossible to recover (column 5, lines 16-39). However, Tewfik does not specifically teach that the scrambling filter is kept as a secret key by a content owner. However, upon further consideration, a new ground(s) of rejection is made in view of Honsinger et al.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 17 and 19-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tewfik et al. (U.S. Patent No. 6,442,283), hereinafter referenced as Tewfik in view of Honsinger et al. (USPN 6,278,791).

Regarding **claim 17**, Tewfik discloses a computer implemented method for embedding hidden data (watermark; column 1, lines 36-54) in an audio signal (column 5, lines 40-43), comprising the steps of:

receiving the audio signal in a base domain (time domain; column 7, lines 27-38);

transforming the received audio data to one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31)

embedding the hidden data in the transformed one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) via parametric representation of the audio signal (column 9, lines 51-62) by manipulating statistical mean of selected mean of selected transform coefficients (column 2, lines 18-49), and applying a scrambling technique to the transform coefficients with a scrambling

filter (column 5, lines 16-39), but does not specifically teach that the scrambling filter is kept as a secret key by a content owner.

Honsinger teaches making the encryption key available only to the authorized users (i.e. a private key; column 8, lines 64-67), to assure that an unauthorized user cannot duplicate the signature.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's method wherein it teaches that the scrambling filter is kept as a secret key by a content owner, to provide a reasonable degree of security for the metadata to prevent tampering or removal by unauthorized individuals (column 2, lines 36-39).

Regarding **claim 19**, Tewfik discloses the method further comprising:

manipulating the statistical measure (statistical F-test; column 9, lines 6-30) of a selected subset of the transform domain coefficients in order to embed the hidden data (column 5, lines 1-9).

Regarding **claim 20**, Tewfik discloses the method and apparatus further comprising:

modulating the embedded data (figure 3, element 304) with at least one predetermined statistical feature of the transformed audio signal (column 11, lines 1-11).

Regarding **claim 21**, Tewfik discloses the method and apparatus further comprising:

increasing the amplitude (change in amplitude; column 8, lines 48-62) of at least one predetermined feature of the transformed audio signal so that statistical mean of

the predetermined feature is positive for embedding a bit of one in the audio signal (column 3, lines 24-36 and column 4, lines 26-27).

Regarding **claim 22**, Tewfik discloses the method and apparatus further comprising:

using a psycho-acoustic model (MPEG psychoacoustic masking model; to control inaudibility of the embedded data (column 5, lines 9-14).

5. **Claims 1-5, 8-12, 15-16, 18 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tewfik in view of Honsinger and in further view of Sharma et al. (U.S. Patent No. 6,480,825), hereinafter referenced as Sharma.

Regarding **claims 1 and 11**, Tewfik discloses a computer implemented method and apparatus for embedding hidden data (watermark; column 1, lines 36-54) in an audio signal (column 5, lines 40-43), comprising the steps of:

receiving the audio signal in a base domain (time domain; column 7, lines 27-38);

transforming the received audio data to one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31)

embedding the hidden data in the transformed one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) via parametric representation of the audio signal (column 9, lines 51-62) by manipulating statistical mean of selected mean of selected transform coefficients (column 2, lines 18-49), and applying a scrambling technique to the transform coefficients with a scrambling

filter (column 5, lines 16-39), but lacks a scrambling filter kept as a secret key by a content owner and wherein transformation of the received audio signal to the cepstrum domain includes a fast Fourier transform, followed by a logarithmic operation, and then an inverse fast Fourier transform.

Honsinger teaches making the encryption key available only to the authorized users (i.e. a private key; column 8, lines 64-67), to assure that an unauthorized user cannot duplicate the signature.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's method and apparatus wherein it teaches that the scrambling filter is kept as a secret key by a content owner, to provide a reasonable degree of security for the metadata to prevent tampering or removal by unauthorized individuals (column 2, lines 36-39).

Tewfik in view of Honsinger teaches a method and apparatus for embedding hidden data, but lacks wherein transformation of the received audio signal to the cepstrum domain includes a fast Fourier transform, followed by a logarithmic operation, and then an inverse fast Fourier transform.

Sharma discloses a system and method for detecting a recorded voice data wherein transformation of the received audio signal to the cepstrum domain includes a fast Fourier transform (column 16, lines 47-48), followed by a logarithmic operation (logarithm), and then an inverse fast Fourier transform (inverse Fourier transform; column 12, lines 46-60), to represent the received audio signal in the cepstral domain.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik in combination with Honsinger's method and apparatus wherein it specifically teaches the three operations to transform a signal to a cepstrum domain, to extract channel characteristics using the concepts of homomorphic deconvolution (column 12, lines 35-40).

Regarding **claim 2**, Tewfik discloses the method and apparatus further comprising:

transforming the received audio signal to the one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) such that transform domain coefficients are generated that are indicative of the transformed non-base domain audio signal (F-value; column 9, lines 24-26).

Regarding **claims 3 and 12**, Tewfik discloses the method and apparatus further comprising:

transforming the received audio signal to one of a linear prediction residue domain and a cepstrum domain (spectrum domain; column 9, lines 11-31) such that transform domain coefficients are generated that are indicative of the transformed non-base domain audio signal (F-value; column 9, lines 24-26).

manipulating the statistical measure (statistical F-test; column 9, lines 6-30) of a selected subset of the transform domain coefficients in order to embed the hidden data (column 5, lines 1-9).

Regarding **claim 4**, Tewfik discloses the method and apparatus further comprising:

modulating the embedded data (figure 3, element 304) with at least one predetermined statistical feature of the transformed audio signal (column 11, lines 1-11).

Regarding **claim 5**, Tewfik discloses the method and apparatus further comprising:

increasing the amplitude (change in amplitude; column 8, lines 48-62) of at least one predetermined feature of the transformed audio signal so that statistical mean of the predetermined feature is positive for embedding a bit of one in the audio signal (column 3, lines 24-36 and column 4, lines 26-27).

Regarding **claims 8 and 15**, Tewfik discloses the method and apparatus further comprising:

using a psycho-acoustic model (MPEG psychoacoustic masking model; to control inaudibility of the embedded data (column 5, lines 9-14).

Regarding **claims 9 and 23**, Tewfik in view of Honsinger discloses a computer implemented method and apparatus for embedding hidden data in an audio signal further comprising:

generating an inverse transformation signal (inverse fourier transform) using the embedded hidden data that is in the transformed audio signal (Tewfik; column 10, lines 40-45);

receiving an attack (shifting) upon the generated inverse transformational signal (Tewfik; column 10, lines 6-21), but lacks wherein transforming the attacked inverse transformation signal to a non-base domain so as to generate a second transformed

audio signal that is in the non-base domain and extracting the embedded hidden data from the second transformed audio signal.

Sharma discloses a system and method for detecting a recorded voice data wherein transforming the attacked inverse transformation signal (inverse Fourier transform) to a non-base domain (cepstral domain; column 12, lines 44-66), so as to generate a second transformed audio signal that is in the non-base domain (column 13, lines 26-67); and

extracting the embedded hidden data (figure 4A, element 240) from the second transformed audio signal (column 13, lines 26-67), to obtain an audio sample.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's in combination with Honsinger's method and apparatus such that the non-base domain is selected from the group consisting of linear prediction residue and cepstrum domain, such that the transformed attacked inverse transformation signal is in the non-base domain to generate a second transformed audio signal that is in the non-base domain and such that it extracts from the embedded hidden data from the second transformed audio signal that is in the non-base domain, to obtain an audio sample for extraction of the channel characteristics or "estimate the channel" for distortion purposes (column 12, lines 23-34) and to prevent fraudulent access to systems (column 3, lines 1-3). This will impose a transparent seal of authenticity that cannot be duplicated easily by an imposter (column 4, lines 25-27). It employs a variety of techniques that, alone or in combination, provide a reliable

system for detecting the use of recorded voice over communication channels (column 3, lines 6-10).

Regarding **claims 10 and 16**, Tewfik discloses the method and apparatus further comprising:

transforming the received audio signal to the cepstrum domain (column 9, lines 11-31);

embedding the hidden data in the cepstrum domain (column 9, lines 11-31); and

enforcing a positive mean to embed a "1" and keeping a zero mean intact to embed a "0" in the cepstrum domain (column 4, lines 19-27 and column 11, lines 26-35).

Regarding **claim 18**, Tewfik discloses a computer implemented method for embedding hidden data in an audio signal, but lacks transforming the received audio signal to the linear prediction residue domain such that transform domain coefficients are generated that are indicative of the transformed audio signal.

Sharma discloses transforming the received audio signal to the linear prediction residue domain (LP) such that transform domain coefficients are generated that are indicative of the transformed audio signal (column 12, line 44 – column 13, line 7 and column 17, lines 58-67), to decouple the speech information from the channel information.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tewfik's method wherein it transforms the received audio signal to the linear prediction residue domain such that transform

domain coefficients are generated that are indicative of the transformed audio signal, to obtain an audio sample for extraction of the channel characteristics or "estimate the channel" for distortion purposes (column 12, lines 23-34) and to prevent fraudulent access to systems (column 3, lines 1-3). This will impose a transparent seal of authenticity that cannot be duplicated easily by an imposter (column 4, lines 25-27). It employs a variety of techniques that, alone or in combination, provide a reliable system for detecting the use of recorded voice over communication channels (column 3, lines 6-10).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sun et al. (USPN 6,678,389) disclose a method and apparatus for embedding digital information in digital multimedia data.

Aggarwal et al. (USPN 6,834,344) disclose semi-fragile watermarks.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jakieda R Jackson whose telephone number is 571.272.7619. The examiner can normally be reached on Monday through Friday from 7:30 a.m. to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571.272.7582. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRJ
July 1, 2005

SUSAN MCFADDEN
PRIMARY EXAMINER